

Wild fruit resources and exploitation in Xiaoxing'an Mountains

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Abstract The ornamental characters, nutritious composition, edible value and medical value of thirteen kinds of major wild fruit resources in Xiaoxing'an Mountains Region were synthetically analyzed such as *Rosa* spp., *Actinidia* spp. and so on. The results showed that the wild fruit resources in this region had important garden ornamental value, edible value and medical value. A lot of good germplasm resources and honey plant resources hadn't been effectively protected and enough utilized. The right way of appropriate arrangement and reasonable exploitation of wild fruit resources in this region should be benefit to get rid of economic crisis early in this region.

Key words: Wild fruit resources, Ornamental character, Nutritious composition, Xiaoxing'an Mountains

Introduction

Xiaoxing'an Mountains lies in the east mountain region of Heilongjiang Province. It is one of major timber forest bases of China. Because of long time unsuitable management and excessive forest broken, the primary vegetation has disappeared completely and has lead to the serious economic crisis situation. However in this region the deposits of wild fruit resources are very large. There are more than 30 kinds of wild fruits that distribute centralized, easy to be collected. Those plants have very high economic value and excellent ornamental value. Some of them are good germplasm resources, which have important protective value and broad exploitation prospects. If these wild fruit resources could be appropriately cultivated and reasonably exploited. It will play a very important role in leading this region to get rid of economic crisis early and promote economic prosperity.

Major wild fruit resources in this area

Rosa spp.

Rosa species belong to Rose family, *Rosa* genus, which includes *R. acicularis* Lindl. and *R. davurica* Pall., often growing in open lands, sparse woods and the fringes of woods, flowering in June and July and bearing red achene in August and September. They are all excellent ornamental plants for flower garden. They are suitable for flower hedge, flower roads, sloping fields, sparse woods and lawns because of their beautiful flowers and fruits. Edible parts per 100g contained vitamin C 1 300~1 700 mg, vitamin E 1.3~4.9 mg, vitamin B₁ 0.25 mg, vitamin A 3.0~26.4 mg, active flavone materials of vitamin P 500~1 500

mg (Zhao *et al* 1987). And they are known as the king of vitamin C. While half of each fruit is red, the content of VC is highest. If the fruits are collected before the frost's coming and frozen storage and lightly and quickly heated during the food process, the loss of VC is very little and vice versa (Zhao 1988). The fruits can be made into fruit juice, fruit wine, health-care drink and VC food addition during food process. And they are valuable health-care food resources and natural VC foods in northeastern China. Meanwhile, their flowers, fruits and roots are all medicinal materials for scurvy, blood vessels disease of heart and brain and have anticancer effect (Zhao 1988). Especially in northeastern China, it is important to exploit *Rosa* spp. because of being lack of fresh and cheap vegetables during the very long winter.

Actinidia spp.

Actinidia spp. belong to Actinidia family, *Actinidia* genus, mainly including *A. Kolomikta* Maxim., *A. polygama* Maxim. and a few *A. argata* Planchon. in Xiaoxing'an Mountains. They often grew in sunny slope of woods, flower in June and July and bear green or yellow berries in September and October. They can be used as climbers on trees and rocks in flower garden, especially in natural garden. Some leaves of *A. polygama* Maxim. are silvery white and some parts turn red in autumn. So it has more ornamental value than others do and it has more patience to environment than others do. The other two species have delicately fragment flowers and fruits, rich nutrition, strong flavour and the broadest exploitation prospects among all kinds of berries. The fruits contain vitamin C 150~300 mg/100 g and yangtao alkali, amino acids and fatty acid and so on. The vitamin C content of *A. kilomikta* Maxim. is 700~1 300 mg/100 g (while which of *A. chinensis* Planch. is 100~300 mg/100 g), its nutrition and flavour are better than that

of *A. chinensis* Planch. Its fruits can be made into fruit wine, fruit juice, especially can be nutrition foods for aviation, navigation, mountaineering, children and patients. The fruits are easy to be soft after maturity and can't stand storage and transport so that they can be collected in 3~5d before being soft or stored in salt. The fruits of these three kinds all have medical value, especially the fruits of *A. polygama* Maxim. contain yangtao alkali and so on, so it has excellent medical value for a strong and healthy, peaceful sleep, and it is a kind of useful medicine for all kinds of cats'diseases. But because of "Silvervine Actinidia Craze" in 1970s, its nature resource has diminished quickly and should be treasured.

***Lonicera caerulea* var. *edulis* Turcz.**

This variety belongs to Honeysuckle family, *Lonicera* genus, which often grows at the banks of rivers in forest regions, hillsides and the fringes of woods, flowers in May and June, bears the dark blue white powdery berries in August and September. Its young branches are covered by red-brown pubescences and old branches are red-brown. It has high ornamental value and is suitable for landscape gardening. Its fresh fruits contain total sugar 5%~6%, tannin 0.5%, citric acid and benzoic acid 3.0%~3.2%, vitamin C 30~50 mg/100 g, active flavone materials of vitamin P 1 200 mg/100 mg, total amino acid 8.30%~9.19%, the essential amino acid for mankind 1.96%~2.72%. Fruits are sour with sweet and delicately fragrant. They are edible. It is an important pigment resource of natural food and excellent brewing wine resource and very precious honey plant resource. And fruits have medical value for antipynetic and antidote (Zhu 1989). Because of its storage is little and the nutrition contentment of fruits varies largely. More research works are required.

***Ribes* spp.**

They belong to Saxifrage family, *Ribes*. Mainly *R. burejense* Fr. Schm. and *R. maximoviczianum* Kom. distributing in this region grow in forests or the fringes of woods. They flower in May and June, bear red or purple-dark berries in July and August. Those species are suitable for garden ornament in north natural scenic spots or in forest gardens. *R. burejense* Fr. Schm. is suitable for thorn-fence. The berries are edible which have a little sour. It can be made into jams and fruit wine, especially the berries of the latter contain some organic acids such as malic acid, tartaric acid, citric acid, sugar and vitamin C 80~400 mg (Jiang 1991). It can be used to cure influenza.

***Vitis amurensis* Rupr.**

It belongs to Grape family, *Vitis*, which often grows in the fringes of woods or the thickets under woods, flowers in May and June, bears the dark-white berries with blue-white frosting. It is a good ornamental garden climber and can product fruits. Only extensive

management is needed, so it is suitable for being planted in garden, parks, sanatorium and residential areas. However, in winter, it must be planted in warm microclimate environment or buried in earth during the whole winter because the windy weather in the winter can be very dangers to them. It is a precious germplasm resource for grape breeding for resistance of cold. The berries contain soluble solid materials 10%~12%, total acid 1%~3%, sugar 9.17%, tannic 0.02%~0.15% and tartaric acid, malic acid, citric acid, glucose, fructose and more than ten kinds of amino acids which are essential for mankind (Ge 1993). It is excellent raw materials for brewing wine, as well as can be made into fruit juice and fruit wine with strong flavor. It is also a precious kind of food resources for making of health-care drink. It dispersed widely in the Xiaoxing'an Mountains and its reserves are enormously. Its roots, leaves and fruits are used as medicine for neuralgia, stomachache and unsuccessful urine (Zhu 1989). Therefore, it has broad exploitation prospects.

***Schisandra* spp.**

This species belongs to Magnolia family, *Schisandra*, *S. chinensis* Baill. is the main species in this region, which often grows in secondary broad-leaved forests, flowers in May, bears deep red berries with spicate on it in August and September. The species can be used in vertical greening, hedges layout and can be used as surface materials in landscape planting. It can dispose with rocks for its beautiful innumerable red fruits. The fresh fruits contain volatile oil 3%, dry fruits contain citric acid 12%, malic acid 10% and little tartaric acid, monosaccharide, resin and arginine (Zhu 1989). The amount of Fe and Mg contained in its boiling diffusion liquid is seven and twice times as much as "Beiqi tea". It can be made into drink and fruit wine and so on. And the fruit is a famous kind of traditional Chinese medicine for neurasthenia, heart exhaustion, excessive fatigued and so on.

In addition, now a new variety has been found in this region: *S. chinensis* Baill. var. *leucocarpa* P. H. Huang et L. H. Zhuo. The fruits of this variety are white after maturity. The seeds of this variety are larger than the former one and the hilums of those seeds are white in colour. The mashed fresh leaves of it have very strongly aromatic odour. It has a significant protecting value and culturing value (Zhuo 1994).

***Prunus padus* L.**

This species belongs to Rose family, *Prunus*, which often grows in woods or river banks, flowers in May and June, bears dark or purple-red drupes when maturity. The maturing time is from August to September. Its fruit has high ornamental value. It grows quickly. The adaptability of this species is very strong. It is an excellent kind of garden ornamental plant. The fruits contain total sugar 6.4%, vitamin P active mate-

rial 780~800 mg/100 g and lots of tannin materials. The edible fruit of this species can be used for brewing wine. It is a kind of honey plant and germplasm resource because the flower has rich nectar. And the flowers, fruits leaves are all medicinal for relieving cough and invigorating the spleen (Zhu 1989).

***Crataegus* spp.**

Crataegus spp. belong to Rose family, *Crataegus* genus. Its species are mainly *C. Pinnatifida* Bunge. and *C. maximowiczii* Schneid. in this region. The species often grow in woods, flower in May and June, bear red drupes when maturity, Maturing period of this drupes is from August to September. It is a kind of fine greening plant because of its neat appearance, flourishing flowers, beautiful leaves and lovely red fruits. Its fruits contain sugar 14.5%, tannin material 0.56%, total acid 4.5% and ursolic acid 1.32%, lots of proteins and carotene and so on. The amount of Fe, Mg contained in the fruit are the most among all kinds of fruits (Zhu 1989). It is a precious kind of health-care food, but its fresh fruits are not suitable for eat. It can be made into jams, fruit wine and fruit juice with unique flavor. Its fruits, roots and stems can be used as medicine for reducing the content of cholesterol and to cure diseases of heart and coronary artery (Zhu 1989). The resource of this species is large in this region, but it has not been used adequately.

***Corylus* spp.**

Corylus species belong to Birch family. *C. mandshurica* Maxim. and *C. heterophylla* Fisch. et Bess. are the two main species distributed in this region. The two species flower in May and June, bear fruit in September and October. They both are major plants for greening, water and soil conservation in northeast China. They distributed widely. But the productive rate of fruits is very low, but we can increase it by stump. The kernel contains coarse fat 50%~70%, protein 16%~18%, carbohydrate 16.5% (Jiang 1991). It is known as "The kind of nuts" because it is an important kind of ligneous oil-bearing plant. It can be eat directly or made into high-ranking cakes and sweets. The kernel of this species is a kind of medicine for curing frailness and relieving cough.

***Rubus* spp.**

Rubus species belong to Rose family. There are mainly *R. crataegifolius* Bunge., *R. matsumuranus* Lev. et Van. And *R. kanayamensis* Lev. et Van. in this region, which flower in June, bear maturing red or dark-red drupes from July to September. They have important ornamental value. The fruits contain some organic acids such as malic acid and citric acid, vitamin C 35~85 mg/100 g, total sugar 5%~7% (Zhu 1989). The edible fruit can be made into jams, fruit wine and so on. The fruit can be used as medicine for inducing sweat or used as antipyretic (Zhu 1989).

***Malus baccata* (L.) Borkh.**

Malus baccata (L.) Borkh. belongs to Rose family. It often grows in forests or the edge of forests, flowers in June and bears maturing red or yellow drupes from August to September. It is a kind of fine garden ornamental plant for its white flowers in spring and its heaps on heaps of red fruits in autumn. The fruits contain total sugar 9.3%, total acid 2.3%. The rate of wine making is 10% (Zhao 1987). The fruits can also be produced into fruit wine and jams by food processing and can be eat directly. It can be used as a stock for grafting apple. It is also a valuable honey plant.

***Fragaria orientalis* Lozinsk-Losinsk**

This species belongs to Rose family, *Fragaria*, flowering in May and June, fruiting in July and August. It is a kind of wonderful ornamental surface plant of landscape gardening. The fruits contain sugar 6.0%~10%, acid 0.6%~1.3%, vitamin C 70 mg/100 g. It is very delicious if it is eaten directly. It is also a good rough material for food processing.

***Pyrus ussuriensis* Maxim.**

It belongs to Rose family. It flowers in May and June, fruits in August to October. Its fruits contain sugar 15%~20%, some kinds of organic acids and vitamins. It is edibles freshly and can be used as medicine for relieving cough, moistening the lungs and can be used as stock. Meanwhile it is a kind good honey plant with high economic value and its seed are very expensive. Since its resource is decreasing quickly, enough protection should be carrying out.

References

- Ge Huibou. 1993. The resources of *Vitis amurensis* and their exploitation in Jilin province. The wild Plant Resources in China, (1): 26~28
- Jiang Minyuan. 1991. The strategy of forestry development in the northeast economical region. Harbin: Northeast Forestry University Press
- Zhao Guangyi, Zhuo Lihuan and Chen Tao. 1987. The wild fruit resources and their exploitation in Tahe Forestry Bureau. Journal of Northeast Forestry University, 15(specialized): 149~154
- Zhu Youchang. 1989. Plantae Medicinales Chinae Boreali-Orientalis. Harbin: Heilongjiang Science and Technology Publishing House
- Zhuo Lihuan and Huang Puhua. 1994. A new variety of *Schisandra chinensis* (Turcz.) Baill at the north part of Heilongjiang province. Bull. Bot. Res., 14(1): 35~36
- Zhao Guangyi. 1988. Study of the *Rosa davurica* Pall. and the quantity changing of vitamin C in the storage and the processing of them. Journal of Northeast Forestry University, 16 (2): 102~103

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